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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,925	10/15/2001	Steven G. Goebel	GB-300745	2085
7590	11/16/2004			EXAMINER
CARY W. BROOKS			KERNs, KEVIN P	
General Motors Corporation				
Legal Staff			ART UNIT	PAPER NUMBER
P.O. Box 300, Mail Code 482-C23-B21				
Detroit, MI 48265-3000			1725	
DATE MAILED: 11/16/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/976,925	GOEBEL ET AL.
	Examiner Kevin P. Kerns	Art Unit 1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 23 August 2004 and 14 September 2004.
- 2a) This action is **FINAL**.                                   2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-11 and 17-28 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-11, 17, 20 and 22-28 is/are rejected.
- 7) Claim(s) 1, 18, 19 and 21 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 23 August 2004 is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Objections***

1. Claim 1 is objected to because of the following informalities: in the 4<sup>th</sup> line from the end of the claim, “,” should be added after “injector” for further clarity. In the last line, “molydate” should be changed to “molybdate”. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-11, 17, 20, and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Etievant et al. (US 6,245,309) in view of Pettit (US 6,232,005), and further in view of Schmidt (US 4,027,476).

Etievant et al. disclose a reactor device for producing hydrogen, in which the reactor includes the following structures: a reactor housing with inlets in one end of the housing and discharge openings at an opposite end; an air charge line 30 and a steam charge line 26, both of which are separately connected to the housing; a fuel injector (having an injector body and orifice) positioned in the housing and extending out of the housing on its inlet end in the form of a fuel charge line 22; and a catalyst bed having two catalyst portions (e.g. plurality of substrates comprising nickel- and platinum-coated granules/pellets, and for which an appropriate catalyst agent would be selected by one of ordinary skill in the art) within respective annular spaces (82,84) carried in the housing and positioned downstream from the fuel injector (abstract; column 1, lines 15-19; column 3, lines 47-67; column 4, lines 1-41; column 6, lines 33-58; column 8, lines 24-67; column 9, lines 49-65; column 10, lines 1-25; and Figures 1-5). Etievant et al. do not disclose the use of a suppression foam positioned between the catalyst bed and fuel injector, in addition to a catalyst agent that includes one or more of gold, lead, or specified lead compounds.

However, Pettit discloses a fuel cell system combustor, in which the system includes the following structures: a catalyst bed 70 having a leading face 72; a mixing media bed 80 and flame arrestor 88 (also serving as a carbon suppression agent); an adjacent porous bed of metal or ceramic foam (light-off catalyst 74) supporting a

catalyst agent and having an array of pores ranging from 10 to 80 pores per inch, with the ceramic foam embodiment comprising zirconia, alumina etc.; and a means to distribute a reaction mixture (atomized fuel) evenly across the leading face 72 of the catalyst bed 70, such that the use of foam adjacent the catalyst bed is advantageous for providing a tortuous path for creating turbulent flow while avoiding autoignition (abstract; column 2, lines 10-67; column 3, lines 1-2 and 24-67; column 4, line 1 through column 7, line 31; and Figures 1-3).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the reactor device for producing hydrogen, as disclosed by Etievant et al., by using the suppression foam material adjacent to the catalyst bed, as taught by Pettit, in order to provide a tortuous path for creating turbulent flow while avoiding autoignition (Pettit; abstract; column 2, lines 30-67; column 3, lines 1-2; column 4, lines 40-67; column 5, lines 1-12 and 28-47; and column 6, lines 25-26).

Neither Etievant et al. nor Pettit specifically discloses a catalyst agent that includes one or more of gold, lead, or specified lead compounds.

However, Schmidt discloses a composite catalyst bed that includes a foam metal matrix packed/coated with a plurality of catalyst particles to form an interconnected porous structure, such that the catalyst particles are selected among a group of metals that include lead, such that these catalyst particles are advantageous for providing a metal matrix with improved heat transfer, thus obtaining more uniform temperatures throughout the matrix and on the catalyst particle surfaces (abstract; column 1, lines 10-

14; column 2, lines 29-68; column 3, lines 1-21 and 57-68; column 4, lines 1-35; column 5, lines 44-53; column 7, lines 4-11; and Figures 1-12).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the reactor device for producing hydrogen, as disclosed by Etievant et al., by using the suppression foam material adjacent to the catalyst bed, as taught by Pettit, in order to provide a tortuous path for creating turbulent flow while avoiding autoignition, and by further using a lead catalyst agent in the metal foam, as disclosed by Schmidt, in order to provide a metal matrix with improved heat transfer, thus obtaining more uniform temperatures throughout the matrix and on the catalyst particle surfaces (Schmidt; abstract; column 4, lines 17-35; column 5, lines 48-53; and column 7, lines 8-11).

#### ***Allowable Subject Matter***

5. Claims 18, 19, and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to teach or suggest the elements of independent claim 1 in addition to the following features: 1) a catalyst bed that includes a first portion having a catalyst to promote partial oxidation of a carbon-based fuel, and a second portion having a catalyst to promote reformation of the carbon-based fuel to form hydrogen

(claim 18); and 2) a fuel injector having at least one tube traversing the cross section of an inlet portion of a housing and having a plurality of holes formed in the tube (claim 21).

***Response to Arguments***

7. The examiner acknowledges the applicants' amendments received by the USPTO on August 23, 2004 (non-compliant amendment) and September 14, 2004 (response to the notice of non-compliant amendment). The replacement drawings of August 23, 2004 overcome the prior objections to the drawings. The September 14, 2004 amendments to the abstract and claims overcome all prior objections to the abstract and claims, as well as the prior 35 USC 112, 2<sup>nd</sup> paragraph rejections. However, new claim objections to claim 1 have been raised by the applicants' amendment (see paragraph 1 above). The applicants have cancelled claims 12-16, but have incorporated similar subject matter into independent claim 1. Claims 1-11 and 17-28 are currently under consideration in the application.

8. Applicants' arguments with respect to rejected claims 1-11, 17, 20, and 22-28 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571)

272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 11/14/04*  
Examiner  
Art Unit 1725

*KPK*  
kpk  
November 14, 2004